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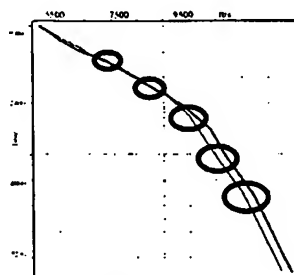
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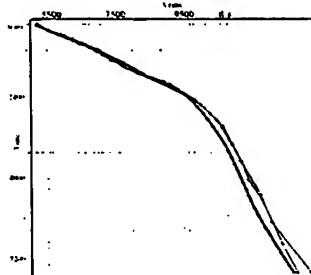
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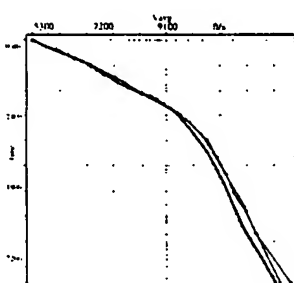
(54) Title: IMPROVED 3D VELOCITY MODELING, WITH CALIBRATION AND TREND FITTING USING GEOSTATISTI-
CAL TECHNIQUES, PARTICULARLY ADVANTAGEOUS FOR CURVED-RAY PRESTACK TIME MIGRATION AND FOR
SUCH MIGRATION FOLLOWED BY PRESTACK DEPTH MIGRATION



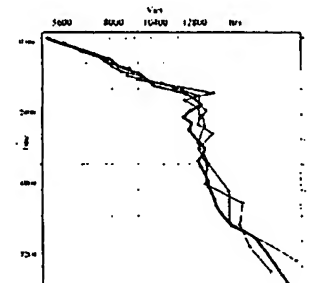
(a) Stacking Velocity Semblance



(b) RMS Velocity



(c) Average Velocity



(d) Interval Velocity

(57) Abstract: A method of constructing a 3D geologically plausible velocity model for efficient and accurate prestack imaging wherein embodiments of the invention provide: (1) a method of calibrating velocity functions, appropriately and effectively taking into account well (hard) and seismic (soft) data as well as geological features, and trend fitting ("iDEPTHing") RMS velocities before curved-ray prestack time migration; (2) a method of calibrating and trend fitting ("iDEPTHing") interval velocities before prestack depth migration, appropriately and effectively taking into account well (hard) and seismic (soft) data as well as geological features; and (3) a method of constructing a geologically plausible velocity model using the previous steps of velocity calibration and trend fitting RMS and interval velocities, for efficient sequential use in prestack time migration followed by prestack depth migration. Advantages of the embodiments include providing a quick turnaround of prestack time and depth migration to interpreters and cutting back resource-intensive interpretation efforts for 3D seismic data. The invention has significant implications for improving aspects of oil and gas exploration and production technologies, including pore pressure prediction, prospect evaluation and seismic attribute analysis.

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